# ACTFA Nitrous Oxide Emission Project

ACTFA has been awarded $1.4M for on-farm investigation and demonstration of CTF effects on soil emissions of nitrous oxide ($N_2O$). This powerful greenhouse gas is cropping agriculture's largest contribution to global warming. The trials will directly compare $N_2O$ emissions from permanent CTF cropping beds, permanent wheel tracks and a once only tractor wheel track. The aim is to use the results to calculate whether full CTF paddocks emit less $N_2O$ in total than non-CTF paddocks.

Nitrous oxide emissions from soil occur largely from fertiliser denitrification processes, so reducing emissions also contributes to an increase in nitrogen use efficiency. This is important in dollar terms, considering that farm produce generally contains less than 50% of the N applied as fertiliser. The other 50% is lost in run-off, leaching or denitrification. We already know CTF will reduce run-off, and should often reduce leaching by increasing the soil's capacity to store plant available water.

Small-scale trials have demonstrated that CTF can roughly halve nitrous oxide emissions. This project, a partnership with the USQ's National Centre for Engineering in Agriculture, will assess the on-farm impact of CTF in grain production systems in Queensland, Victoria and Western Australia. Emission impacts will be assessed by monitoring changes in gas concentrations within chambers strategically positioned in the paddock (see Figure 1).

Most denitrification occurs in waterlogged, or near-waterlogged, soils when nitrate and organic matter are available. Soil porosity is improved under CTF, reducing the frequency and duration of near-waterlogging events, and hence reducing the opportunities for denitrification.

This combination of reductions in denitrification, run-off and leaching might account for the reports of "increased yield with reduced fertiliser inputs" included in grower presentations at a number of the CTF conferences. More detail on the earlier trial results is available in the attached paper.

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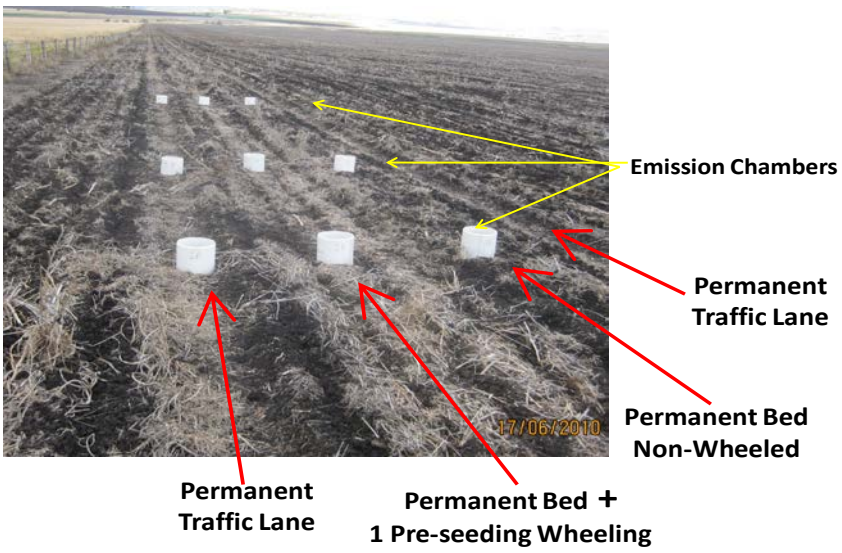


**Fig.1. $N_2O$ emission monitoring, after wheat planting, in 3m CTF on Darling Downs clay soil**